

LETTERS TO THE EDITOR

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[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

The Gulf-Weed (*Sargassum bacciferum*) a Means of Migration for Fishes and Marine Invertebrates

OWING to the October number of NATURE having been mislaid, I have not had an opportunity until lately of seeing Mrs. Merrifield's remarks upon Gulf-weed which appear in vol. xviii. p. 708, where the Bermudas are alluded to as a locality where this species grows *in situ*.

Having during my several visits to those islands of late years paid some attention to the Sargassum and its inhabitants, perhaps the few facts I am in possession of may prove interesting to botanists, and those who study the geographical distribution of marine animals.

The Bermudas, being situate within that somewhat circular area of the North Atlantic, formed by the currents of the Gulf Stream, the North African, and equatorial currents, within which exists that vast accumulation of weed known from the time of Columbus to the present day as the "Sargasso Sea," afford excellent opportunities for studying the plant in its floating condition, and also adherent in its natural state to the reef. During the winter months the prevailing gales, which are generally from south-east to south-west, bring to the islands large fields, as well as isolated patches, of the Gulf-weed, which prove a great boon to Bermudan farmers, who, but for this ocean waif, would often be minus manure sufficient to raise their root-crops with. To an observer a field of weed coming in from sea presents a somewhat variegated surface as regards colour, the major portion of it being of a dark brown, interspersed with spots and patches of light yellow. On closer inspection, these masses of floating weed are found to be inhabited by various species of pelagic and littoral crustaceans, particularly a small light brown crab, having a blotch of white on the carapace. Here and there the eye rests on a little pearly-white object, the well-known shell of that almost unknown cephalopod, *Spirula prototypus*, of Peron. The pretty purple shell of *Ianthina communis* is also to be seen, as are the singular forms of those truly oceanic aculeates, *Valella communis* and *Physalia pelagica*, which occasionally occur in large numbers, as they did during a heavy southerly gale on April 16, 1861, when countless myriads were literally wrecked upon the shores, together with the shells and rafts of *Ianthina*. About the margins of these floating fields, which are of some depth, may be seen various species of fishes, most of which have, no doubt, accompanied the fields, and lived in them, as game would do in a preserve where food and shelter are found. There is one species of fish which, above all others, seems to belong to the Sargassum, viz., the Marbled Angler (*Antennarius marmoratus*), which, from its peculiar arm-like pectorals, is specially fitted to rest upon the weed. Here it makes its wonderful nest amidst the mass, suspended by means of those silk-like fibres, which prove amply strong enough to support the large bunches of eggs, which hang like grape clusters within their orbicular case. These nests are occasionally to be found, but cannot be considered common; and only a few have been obtained from the weed on the Bermudan shore.

There is hardly a doubt that it is from this fish-preserve in mid-Atlantic that those tropical and semi-tropical forms which occur incidentally at the Bermudas, Azores, Canaries, Madeira, and also on the east coast of America, come, for I have frequently obtained from these masses of gulf-weed, species which are not recognised as Bermudan, and would probably never have visited the island waters unless under the friendly shelter of the weed. Moreover, I have observed even in heavy storms that the sea never breaks throughout these floating fields, but although heaving and swelling to the usual height, remains unruffled just as if oil floated on the surface. This absence of disturbance would of itself commend the field of weed to the fishes; but when we consider other suitable adjuncts, such as supply of food, and shelter from enemies, we cannot fail to realise the excellent means of migration which this common possession affords, not only to fishes, but to all kinds of those lower invertebrate forms,

many of which have most certainly been brought to the shores of the Bermudas by this means. The isolated patches of weed, which follow the course of the Gulf Stream, and become broken into lesser fragments, are also accompanied by those tropical and semi-tropical fishes which are found almost every summer on the coast of Nova Scotia, and even as far north as Newfoundland; and it is evident that without some such agency we could never account for the abundance of certain southern pelagic fishes which annually occur in our high latitude.

In regard to the original habitat of *S. bacciferum*, as also the origin of that vast mass of floating weed which exists in mid-Atlantic, and is wholly composed of this species, I fear we must await further oceanic exploration. Although I am well aware that it grows in certain places on the Bermuda shores, those shores, even if they were wholly clothed with it, could not supply a tithe of the material which forms the vast accumulation of the weed existing in the Sargasso Sea. As to the allusion in Mrs. Merrifield's paper (quoting Agardh), made concerning the *S. bacciferum* being an inhabitant of the banks of Newfoundland, and other parts of the coast of north-east America, I can safely say that it is wholly unknown on this coast, save occasional sprays, which are brought north by the Gulf Stream, as are the fishes I have before alluded to.

Halifax, Nova Scotia, January 25 J. MATTHEW JONES

The Highest Tide on Record

IN Lyell's "Principles of Geology," tenth edition, 1867, vol. i. p. 494, occurs a statement, given on the authority of Admiral Sir F. Beaufort, to the effect that the tides at Chepstow on the Wye sometimes rise to 69 and even to 72 feet. The statement is familiar to all who have read Lyell's work. If it be correct then this tide of 72 feet at Chepstow is apparently the greatest in the world, that in the Bay of Fundy being given as 70 feet in the extreme. I can find no authority for a tide so great as 72 feet at Chepstow other than that above cited. The old "Bristol Channel Pilot" books of 1821 and 1839 say nothing of the matter, as I am informed by Capt. Tizard, R.N., and the latest published "Pilot" gives 56 feet as the extreme rise of tide at Chepstow. There is thus no official knowledge of so high a tide as 72 feet, and I can find no published account of Admiral Sir F. Beaufort's observations; Sir C. Lyell refers to none such.

I should be extremely obliged to any reader of NATURE who can refer me to any certain record of exceptionally high tides at Chepstow and confirmation of Sir C. Lyell's statement. There seems to be some uncertainty as to whether the highest tides on record occur in the British Islands or not.

Exeter College, Oxford

H. N. MOSELEY

The Glacial Period and Geographical Distribution

PROF. ASA GRAY, in his very interesting lecture on the distribution of the forest trees of the northern temperate region (NATURE, vol. xix. p. 327), after pointing out the remarkable differences that exist between the forests of the eastern and western sides both of North America and the Old World, suggests that the great poverty of the European as compared with the Japan-Manchurian region in this respect was caused by the Mediterranean cutting off the retreat of the flora which then occupied Europe, as it retired, at the approach of the glacial epoch, before the ice from the north. This explanation derives considerable support from some other facts in geographical distribution. The most characteristic Alpine and Arctic butterflies of the Palæarctic region belong to the three genera, *Parnassius*, *Chionobas*, and *Erebia*. Of *Parnassius*, Dr. Staudinger, in his latest catalogue (1871) enumerates fourteen Palæarctic species, of which three occur in North and Central Europe, ranging as far south as the Balkans, but always in or near high lands, about a dozen occur in temperate Asia, ranging as far east as the Amur, and probably as many in North America, where they also are truly Alpine butterflies. Of *Chionobas* one species (*C. aello*, confined to the Alps) occurs in Central Europe, whilst six or seven others range from Lapland over Russia and Siberia, Mongolia, &c., to the Amur, and there are numerous species in Arctic and Alpine North America. Of *Erebia* there are forty-five Palæarctic species enumerated by Staudinger, and of these no less than twenty-five occur in the central Alpine chains of Europe. The genus likewise ranges all over temperate Asia, going as far south as the Himalayas and Moupin, and in North

America is represented by a dozen or more species. Now, though an *Erebia* (*E. Tyndarus*, var.) occurs as far south in Europe as the Sierra Nevada, not a single species of any of these three genera occurs in North Africa, although the Atlas Mountains would seem eminently well suited for such Alpine insects. In this case, then, it seems clear that the same cause—the barrier of the Mediterranean—which in the case of the miocene flora of Europe prevented any further retreat south, has operated to prevent any similar southerly spread amongst the victorious invaders from the north which pressed on the retiring host.

With regard to the general similarity in facies and richness between the East American and East Asiatic tree-flora, certain facts pointing in the same direction will at once occur to the zoologist. Thus the *Menopomas* of the Ohio and Alleghany have their only near relations in the gigantic *Sieboldias* of north-east Asia, one species of these occurring in Japan, the other being one of Père David's discoveries in Moupin. Similarly with the genus *Polyodon* amongst ganoids. Only two species of this genus are at present known, *P. folium*, inhabiting the Mississippi, *P. gladius* the Yang-tse-kiang. The recent discovery of at least two species of *Scaphi rhynchus* in Turkestan makes it probable that ere long species of that Americo-Asian genus will be found in the Chinese rivers as well. The parallelism in the case of the salamanders is particularly interesting, when one remembers the celebrated *Andrias Scheuchzeri* of the Eningen beds, and it tends to favour the view that at that time practical identity in the forms of animals and plants reigned throughout the northern temperate zone.

W. A. FORBES

Cambridge, February 14

P.S.—The reported discovery (*NATURE*, vol. xix. p. 351) of a true alligator in the Yang-tse-kiang, will, if confirmed, add a still more remarkable case to those mentioned above.

Leibnitz and the Royal Society

PROF. TAIT and myself ought not to be at issue on this question. I suppose we both want to get at the facts; and, for my part, I have no more desire to whitewash a foul reputation than he can have to blacken a fair one. Where we differ appears to be, as to how far Leibnitz's reputation can stand the test of facts. The question, however, is not whether Leibnitz acted disingenuously in respect to Gregory's series, or any other subordinate matter, but whether he was indebted to something of Newton's, surreptitiously imparted to him, for his differential calculus. If the grounds upon which that charge was made are swept away, there is an end of it. But if, on the other hand, that is not found feasible, and evidence to character becomes a factor in the final decision, then it is right to examine into those subordinate matters. Till then, I, for one, decline to touch them. At the same time let me say that I never undertook to be bail for Leibnitz's impeccability. All I said or say is, that on the published facts I believe that Leibnitz was led to the calculus by his own honest speculations, and had not the means of stealing from Newton, had he been that way disposed. But there are so many relative papers still unpublished, but publishable, that it is impossible to arrive at a true decision till at least some of them have been submitted to an authorised tribunal.

Prof. Tait recommends me to repeat the fruitless attempt of Dr. Slowman. I decline to follow the example of that ominously surnamed *savant*; for it is contrary to precedent that the pursuer should ask the defender to show his hand; and I am quite sure that "the proper authorities" abroad have too much sense to take the initiative. So I appeal to the Council of the Royal Society of 1879 (not that of 1712, as Prof. Tait gives it), and I do so for these two reasons:—

1. The so-called *Commercium* of 1712, which was merely a statement, arriving at no decision on the principal question, contained several allegations (apparently inconsistent with known facts) which give colour to the charge against Leibnitz; it is then an obvious duty on the part of the Royal Society, who were on the occasion represented by the Committee, to give the proof, or make the reparation.

2. The first-published charge against Leibnitz, which was made by Wallis in 1695, was based on allegations said to have been derived from papers and letters in the possession of the Royal Society; it is but fair, then, that those papers and letters should be published.

I therefore once more respectfully urge upon the Royal Society to reopen the main question, and publish such of the relative

papers, &c., in their possession as directly bear upon the original charge.

C. M. INGLEBY

Athenæum Club, February 8

Ear Affection

THE experience of "P." as given in *NATURE*, vol. xix. p. 315, is physiologically interesting, and by no means usual. Before attempting an explanation it may be as well to assume that only one of "P.'s" ears was affected by the disorder, as by this hypothesis we get the greatest possible divergence from the healthy state. It would have been easy to ascertain which was the faulty organ at the time by requesting a musical friend to listen while "P." vocalised the note of the tuning-fork as conveyed to him by each ear separately. The discordant ear would then have been revealed.

The fault of hearing must have been due either to some mechanical misadjustment of the auditory apparatus, by which a wrong sensation was conveyed to the brain, or else to some deep-seated brain or nerve lesion, which led to a faulty conception of the original sound. Let us consider briefly the first of these cases.

From the exceedingly scanty description of his disorder given by "P." I gather that the discord was mostly conspicuous when the note was high pitched (such as when whistled). Now it sometimes happens from paralysis of the chorda tympani nerve, or even from occlusion of the Eustachian tube, that the tension of the ear-drum is preternaturally increased. Such affections, as aurists well know, frequently intensify to a distressing degree the hearing of high pitched notes, whilst they correspondingly diminish the sound of the lower tones of the chromatic scale. This result is probably obtained by the fact that the tense membrane responds more readily to the rapid vibrations of the higher tones than it does to those of a slower rate. We must also remember that the power of lessening the tension of the membrane is in such cases very seriously impaired, and, as a consequence, the power of adjustment also. I do not suppose that in "P.'s" case there was any actual paralysis of the tympanic muscles, but it is just possible that there may have been a certain degree of misadjustment of the drum of the affected ear due to a feeble and imperfect contraction of one or the other of the muscles referred to. If the disorder was, as I surmised, accompanied with great tenseness of the membrane, the laxator tympani would be the faulty muscle. We might, I believe, under such circumstances, expect the ear-drum to vibrate discordantly in response to a note, for Helmholtz's experiments with stretched strings would suggest that this is feasible within certain limits. As a matter of fact this discordance is rare, and therein rests the interest of "P.'s" case.

I can scarcely believe that in his case any of the deeper structures of the ear were seriously implicated, otherwise he would hardly have made such a rapid and complete recovery as he did.

Brighton, February 10

W. AINSLIE HOLLIS

YOUR correspondent "P." (*NATURE*, vol. xix. p. 315) desires an explanation of the phenomenon of alteration in the pitch of sounds, which he has experienced in his own person whilst suffering from temporary deafness. Your second correspondent on this subject, Dr. Wallich (p. 340), was under my observation at the time of his experiencing the same peculiar and comparatively rare aberration, and I was able myself to verify his statements.

I propose with your permission to give an explanation which appears satisfactory to myself, and hope it may be so to your correspondent "P."

Persons suffering in this way find that sounds heard by the affected ear appear to be sharper or flatter than their true pitch as heard by the other ear, and hence a sound may even appear double.

The internal ear, or labyrinth, must be the part affected, and in all probability it is the cochlea which is at fault. Now most authorities are agreed that the pitch of a sound is appreciated by the cochlea in the following manner. Each tone, or division of a tone, has its corresponding portion on the spiral lamina of the cochlea, which under ordinary circumstances can only be affected by that tone. So that the sound-wave produced by a certain tone passes along the keyboard (as it were) of the spiral lamina until it reaches its own key, which it strikes or so affects as to cause an impression to be sent from that portion of the lamina to the brain. Hence the appreciation of variation in the pitch of sounds.